

1 395 908

(21) Application No. 28596/71 (22) Filed 18 June 1971

(19)

(23) Complete Specification filed 15 June 1972

(44) Complete Specification published 29 May 1975

(51) INT. CL.<sup>2</sup> F16D 65/12 65/84

(52) Index at acceptance

F2E 2N2B4 X5

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## (54) IMPROVEMENTS RELATING TO DISC BRAKES

(71) We, GIRLING LIMITED, a British Company of Kings Road, Tyseley, Birmingham 11, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in disc brakes of the kind in which friction members are applied to opposite faces of a disc mounted to rotate with a wheel or other part of a vehicle transmission.

When the brake is applied, and particularly when it is only lightly applied, there is a tendency for high frequency vibrations to be set up in the disc and this leads to the production of a high-pitched squeal.

Various proposals have been made for preventing or reducing squeal, these usually comprising some form of ring fitting around the periphery of the disc and intended to damp out vibrations of the disc.

In one proposed arrangement an annular groove in the periphery of a brake disc is packed with copper or other metal wire having a certain freedom of movement, the wire being retained in the groove by an encircling metal band received in a widened part of the outer end of the groove.

In another proposed arrangement a flat annular damping plate of a material such as rubber or a metal different from that of a brake disc, is fixed in a narrow radial slit in the disc extending in from its periphery, or the braking surface of the disc is formed by two parallel annular parts between which the damping plate is clamped.

Our invention comprises a disc for a disc brake of the kind set forth incorporating means for damping high frequency vibrations of the disc which produce squeal on application of the brake, said means consisting of an annular damping member which is separate from the disc and is received in an annular groove in the periphery of the disc, wherein the annular damping member is a continuous metal band which is spaced from the base of the groove by one or more

rings of relatively distortable and compressible thermally insulating material with which the band is in contact and which serve to reduce the transmission of heat from the disc to the band.

A preferred material for the ring or rings is asbestos, the ring or rings being formed of woven or stranded asbestos. Asbestos is effective for reducing the transmission of heat from the disc to the damping member so that the damping member does not distort appreciably and its efficiency as a damping medium is not reduced.

Where the brake disc is of the annular ventilated type with radial or part-helical passages extending between its inner and outer edges to allow cooling air to flow through it, the damping member will be formed with openings adapted to register with the outer ends of the passages in the disc.

One example of a ventilated brake disc fitted with a preferred form of our improved damping means is illustrated in the accompanying drawings in which:—

Figure 1 is a fragmentary section in perspective of a peripheral portion of a brake disc.

Figure 2 is a similar view without the damping means.

Figure 3 is a perspective view of the joint in the retaining band, and

Figure 4 is a fragmentary sectional view in perspective of a modification incorporating a single ring.

In the drawings the brake disc comprises two flat parallel rings 1, 2 presenting braking surfaces on their outer faces and rigidly connected by radial integral webs 3. The webs are spaced angularly to leave between them radial ventilating passages 4 extending between the inner and outer edges of the disc.

A groove 5 having flat parallel side walls 6 is formed in the periphery of the disc. In the form shown in Figures 1 and 2 there is at the radially inner end of each side wall an annular recess 7 which houses an asbestos cord 8 seen in Figure 1.

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- The cords are retained in the recesses by a damping member comprising a peripheral flat metal band 9 of such a width as to fit within the radially outer part of the groove
5. The band is formed with openings 10 which register with the outer ends of the passages 4 in the disc, and it is secured in position by providing on one end a tag 11 which is passed through one of the openings 10 and doubled back as shown in Figure 3.
- The asbestos cords serve to reduce the transmission of heat from the disc to the band 9.
15. In the modification shown in Figure 4 the recesses 7 are omitted and the separate asbestos cords are replaced by a single flat asbestos ring 12 seated on the base of the groove in the disc.
20. The ring is retained in position by a peripheral flat metal band similar to the band 9 described above.
- WHAT WE CLAIM IS:—**
25. 1. A disc for a disc brake of the kind set forth incorporating means for damping high frequency vibrations of the disc which produce squeal on application of the brake, said means consisting of an annular damping member which is separate from the disc and is received in an annular groove in the preiphery of the disc, wherein the annular damping member is a continuous metal band which is spaced from the base of the groove
30. by one or more rings of relatively distortable
- 35.
- and compressible thermally insulating material with which the band is in contact and which serve to reduce the transmission of heat from the disc to the band.
2. A disc for a disc brake as claimed in Claim 1 in which annular recesses are formed at the radially inner ends of the side walls of the annular groove in the disc, and rings of relatively distortable and compressible thermally insulating material are seated in the said recesses in which they are retained by the metal band which fits within the radially outer part of the groove.
3. A disc for a disc brake as claimed in Claim 1 or Claim 2 in which the ring or each ring is formed of woven or stranded asbestos.
4. A disc for a disc brake as claimed in Claim 1 in which the disc is annular and has radially or part-helical passages extending between its inner and outer edges for the passage of cooling air, and openings are formed in the damping member to register with the outer ends of the passages in the disc.
5. A disc for a disc brake of the kind set forth substantially as described with reference to the accompanying drawings.

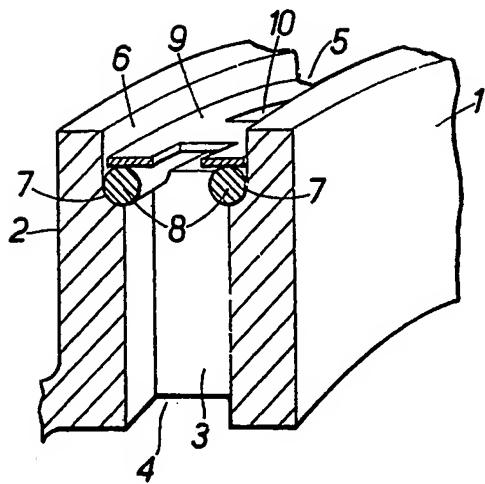
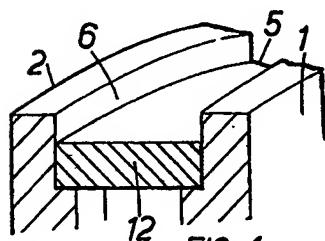
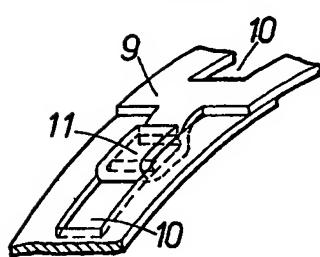
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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1975.  
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,  
from which copies may be obtained.

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## COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*FIG.1.FIG. 3.FIG. 2.